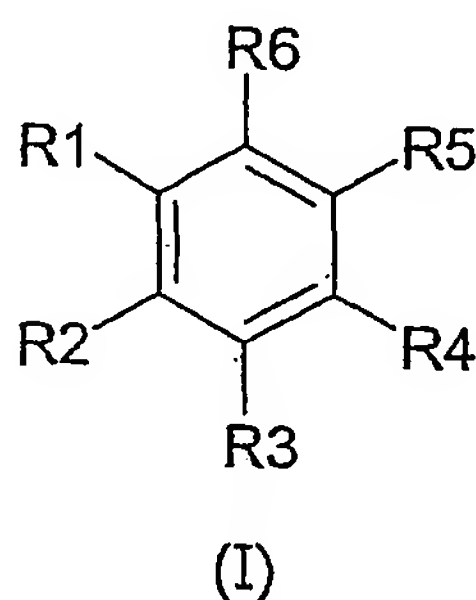


AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of all claims in the application.

LISTING OF THE CLAIMS

Claim 1. (Currently amended) An aqueous acidic solution for electrolytically depositing copper coatings, said solution containing copper ions, at least one oxygen-containing, high molecular additive and at least one water soluble sulfur compound, characterized in that the solution additionally contains at least one aromatic halogen derivative having the general formula



wherein R1, R2, R3, R4, R5 and R6 are each independently radicals selected from the group consisting of hydrogen, aldehyde, acetyl, hydroxy, hydroxyalkyl having 1- 4 carbon atoms, alkyl having 1-4 carbon atoms and halogen, with the proviso that the number of radicals R1, R2, R3, R4, R5 and R6 which are halogen ranges from 1-5 and that the number of radicals R1, R2, R3, R4, R5 and R6 which are hydrogens ranges from 1-5,

wherein the concentration of the at least one aromatic halogen derivative having the formula (I) ranges from ~~about~~ 0.005 to 0.5 mg/l ~~about 0.9 mg/l~~.

Claim 2. (Canceled)

Claim 3. (Previously presented) The solution according to claim 1, characterized in that the aldehyde is selected from the group consisting of formyl (-CHO), methylformyl (-CH₂-CHO) and ethylformyl (-C₂H₄-CHO).

Claim 4. (Previously presented) The solution according to claim 1, characterized in that alkyl is branched or unbranched and is selected from the group consisting of methyl, ethyl, n-propyl, iso-propyl, n-butyl, iso-butyl and tert-butyl.

Claim 5. (Previously presented) The solution according to claim 1, characterized in that the alkyl having 1-4 carbon atoms is hydroxyalkyl and that it is branched or unbranched.

Claim 6. (Previously presented) The solution according to claim 1, characterized in that at least one hydroxyalkyl is hydroxymethyl.

Claim 7. (Previously presented) The solution according to claim 1,

characterized in that the at least one aromatic halogen derivative is selected from the group consisting of

2-chlorobenzaldehyde;
2-chlorophenol;
4-chloro-3-methylphenol;
2-chloro-4,5-dimethylphenol;
4-chloro-3,5-dimethylphenol;
4-chlorophenol;
3-chlorophenol;
o-chloroacetophenone;
2-chlorobenzyl alcohol;
4-bromo-2,6-dimethylphenol;
4-bromophenol;
2,4-dichlorobenzyl alcohol;
2,6-dibromo-4-methylphenol;
2,5-dichlorophenol;
3,5-dibromobenzaldehyde;
2,5-dibromobenzoic acid;
2,4,6-trichlorophenol; and
2,3,6-trichlorobenzaldehyde.

Claim 8. (Previously presented) The solution according to claim 1,

characterized in that the at least one oxygen-containing, high molecular additive is selected from the group consisting of polyvinyl alcohol; carboxymethyl cellulose; polyethylene glycol; polypropylene glycol; stearic acid polyglycol ester; oleic acid polyglycol ester; stearyl alcohol polyglycol ether; nonylphenol-polyglycol ether; octanol polyalkylene glycol ether; octanediol-bis-(polyalkylene glycol ether); poly(ethylene glycol-ran-propylene glycol); poly(ethylene glycol)-block-poly(propylene glycol)-block-poly(ethylene glycol); and poly(propylene glycol)-block-poly(ethylene glycol)-block-poly(propylene glycol).

Claim 9. (Previously presented) The solution according to claim 1, characterized in that the at least one water soluble sulfur compound is selected from the group consisting of organic, nitrogen-free thio compounds and the salts thereof.

Claim 10. (Previously presented) The solution according to claim 9, characterized in that the salts contain alkali or earth alkali metal ions, selected from the group consisting of sodium, potassium, magnesium and calcium.

Claim 11. (Previously presented) The solution according to claim 9, characterized in that the at least one organic nitrogen-free thio compound is selected from the group consisting of sodium salt of 3-(benzthiazolyl-2-thio)-propylsulfonic acid; sodium salt of 3-mercaptopropane-1-sulfonic acid; disodium salt of thiophosphoric acid-O-ethyl-bis-(T-sulfopropyl)-ester; trisodium salt of thiophosphoric acid-tris-(T-

sulfopropyl)-ester; sodium salt of ethylenedithio dipropyl sulfonic acid; disodium salt of bis-(Δ -sulfophenyl)-disulfide; disodium salt of bis-(T-sulfopropyl)-sulfide; disodium salt of bis-(T-sulfopropyl)-disulfide, disodium salt of bis-(T-sulfohydroxypropyl)-disulfide; disodium salt of bis-(T-sulfobutyl)-disulfide; sodium salt of methyl-(T-sulfopropyl)-disulfide; sodium salt of methyl-(T-sulfobutyl)-trisulfide; potassium salt of O-ethyl-dithiocarbonic acid-S-(T-sulfopropyl)-ester; and thioglycolic acid.

Claim 12. (Previously presented) The solution according to claim 1, characterized in that acid is contained in the solution and that the acid is selected from the group consisting of sulfuric acid, hydrochloric acid, fluoboric acid and methanesulfonic acid.

Claim 13. (Previously presented) The solution according to claim 1, characterized in that the solution additionally contains chloride ions.

Claim 14. (Original) The solution according to claim 13, characterized in that the chloride ions have been added to the solution in the form of sodium chloride and/or of hydrochloric acid.

Claim 15. (Previously presented) The solution according to claim 1, characterized in that the solution additionally contains at least one organic, nitrogen-containing compound.

Claim 16. (Currently Amended) The solution according to claim 15, characterized in that the at least one organic nitrogen-containing thio compound is selected from the group consisting of:

thiourea;
N-acetylthiourea;
N-trifluoroacetyl thiourea;
N-ethylthiourea;
N-cyanoacetyl thiourea;
N-allylthiourea;
o-tolylthiourea;
N,N'-butylene thiourea;
thiazolidine thiol-2;
4-thiazoline thiol-2;
imidazolidine thiol-2-(N,N'-ethylene thiourea);
4-methyl-2-pyrimidine thiol; and
2-thiouracil.

Claim 17. (Previously presented) The solution according to claim 1, characterized in that the solution additionally contains at least one polymeric phenazinium compound.

Claim 18. (Previously presented) The solution according to claim 17, characterized in that the at least one polymeric phenazinium compound is selected from the group consisting of poly(6-methyl-7-dimethylamino-5-phenyl-phenazinium sulfate); poly(2-methyl-7-diethylamino-5-phenyl-phenazinium chloride); poly(2-methyl-7-dimethylamino-5-phenyl-phenazinium sulfate); poly(5-methyl-7-dimethylamino-phenazinium acetate); poly(2-methyl-7-anilino-5-phenyl-phenazinium sulfate); poly(2-methyl-7-dimethylamino-phenazinium sulfate); poly(7-methylamino-5-phenyl-phenazinium acetate); poly(7-ethylamino-2,5-diphenyl-phenazinium chloride); poly (2,8-dimethyl-7-diethylamino-5-p-tolyl-phenazinium chloride); poly(2,5, 8-triphenyl-7-dimethylamino-phenazinium sulfate); poly(2,8-dimethyl-7-amino-5-phenyl-phenazinium sulfate); and poly(7-dimethylamino-5-phenyl-phenazinium chloride).

Claim 19. (Previously presented) The solution according to claim 1, characterized in that the solution additionally contains at least one polymeric nitrogen compound.

Claim 20. (Currently amended) The solution according to claim 19, characterized in that the at least one polymeric nitrogen compound is selected from the group consisting of polyethylene imine, polyethylene imide, polyacrylic acid amide, polypropylene imine, polybutylene imine, N-methyl polyethylene imine, N-acetyl polyethylene imine, and N-butyl polyethylene imine.

Claim 21. (Canceled)

Claim 22. (Canceled)

Claim 23. (Canceled)

Claim 24. (Previously presented) A method of electrolytically depositing copper coatings on metal or plastic surfaces, comprising bringing the surfaces into contact with the solution according to claim 1 and electrolytically depositing copper onto the surfaces.

Claim 25. (Previously presented) The method of claim 24, wherein the metal or plastic surfaces are printed circuit board material.

Claim 26. (Previously presented) The method of claim 24, wherein the method includes the step of moving said metal or plastic surfaces in vertical and/or horizontal conveyORIZED plating lines.

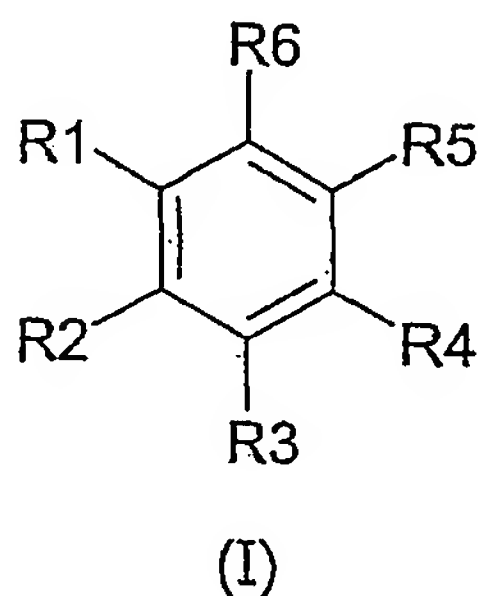
Claim 27. (Withdrawn) A printed circuit board having at least one surface with a copper coating thereon, which copper coating is applied by bringing the at least one surface into contact with the solution according to claim 1 and electrolytically depositing copper onto the surface.

Claim 28. (Previously presented) The solution according to claim 10, characterized in that the at least one organic nitrogen-free thio compound is selected from the group consisting of sodium salt of 3-(benzthiazolyl-2-thio)-propylsulfonic acid; sodium salt of 3-mercaptopropane-1-sulfonic acid; disodium salt of thiophosphoric acid-O-ethyl-bis-(T-sulfopropyl)-ester; trisodium salt of thiophosphoric acid-tris-(T-sulfopropyl)-ester; sodium salt of ethylenedithio dipropyl sulfonic acid; disodium salt of bis-(p-sulfophenyl)-disulfide; disodium salt of bis-(T-sulfopropyl)-sulfide; disodium salt of bis-(T-sulfopropyl)-disulfide; disodium salt of bis-(T-sulfohydroxypropyl)-disulfide; disodium salt of bis-(T-sulfobutyl)-disulfide; sodium salt of methyl-(T-sulfopropyl)-disulfide; sodium salt of methyl-(T-sulfobutyl)-trisulfide; potassium salt of O-ethyl-dithiocarbonic acid-S-(T-sulfopropyl)-ester; and thioglycolic acid.

Claim 29. (Previously presented) The solution according to claim 1, characterized in that wherein, when R1-6 is COH and the radical at a position para to the COH is OH, the radical at the ortho position relative to the COH is a radical other than chlorine, wherein, when R1-6 is COH and the radical at the position ortho to the COH is chlorine, the radical at the position para to the COH is a radical other than OH, and wherein, when a OH radical is at a meta position relative to the position of a radical that is chlorine, COH is not at an ortho position relative to said chlorine radical.

Claim 30. (New) The solution according to claim 1, characterized in that the aromatic halogen derivative of general formula (I) is not any one of 2-chloro-4-hydroxybenzaldehyde, 4-chlororesorcinol and 3-chlorophenol.

Claim 31. (New) An aqueous acidic solution for electrolytically depositing copper coatings, said solution containing copper ions, at least one oxygen-containing, high molecular additive and at least one water soluble sulfur compound, characterized in that the solution additionally contains at least one aromatic halogen derivative having the general formula



wherein R1, R2, R3, R4, R5 and R6 are each independently radicals selected from the group consisting of hydrogen, aldehyde, acetyl, hydroxy, hydroxyalkyl having 1-4 carbon atoms, alkyl having 1-4 carbon atoms and halogen, with the proviso that the number of radicals R1, R2, R3, R4, R5 and R6 which are halogen ranges from 1-5 and that the number of radicals R1, R2, R3, R4, R5 and R6 which are hydrogens ranges from 1-5,

wherein the concentration of the at least one aromatic halogen derivative having the formula (I) is less than 1.0 g/L and is not any one of 2-chloro-4-hydroxybenzaldehyde, 4-chlororesorcinol and 3-chlorophenol.

32. (New) The solution of claim 31, wherein the concentration of the at least one aromatic halogen derivative having the formula (I) ranges from 0.005 to 0.9 mg/l.